



Input parameters in the models

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Input parameters in the models

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$$P_{rg} = \frac{AP+Sp-1}{Se+Sp-1} \int_a^b \epsilon \Theta^{\sqrt{17}} + \Omega \int \delta e^{i\pi} = \{2.7182818284\}$$

Δ \int_a^b ϵ Θ $\sqrt{17}$ $+$ Ω \int $\delta e^{i\pi}$ $=$ $\{2.7182818284\}$
 ∞ χ^2 Σ $!$ $>$



History

- Start with one infected herd (index herd)



History

- Start with one infected herd (index herd)
- Day1 – Infected



History

- Start with one infected herd (index herd)
- Day1 – Infected
- Day5 – Showing clinical signs



History

- Start with one infected herd (index herd)
- Day1 – Infected
- Day5 – Showing clinical signs
- Day21 – Detected



History

- Start with one infected herd (index herd)
 - Day1 – Infected
 - Day5 – Showing clinical signs
 - Day21 – Detected
-
- Index species (cattle, pigs, sheep and goats)
 - Densely and sparsely populated areas

Movements and contacts

	High risk	Medium risk	Low risk
Including	Animals	Veterinarians	Visitors
		Art. Insimin.	Rendering
		Milk control	Feed trucks
			Milk tanks*
			Abattoir trucks*
Frequency	Herd based	Based on herd type	Based on herd type
Movement distance	Based on herd type	Same for all herds	Based on herd type
P(trans)	0.95 (0.9-1)	0.5 (0.1-0.9)	0.175 (0.05-0.35)
swine	0.95 (0.9-1)	0.2 (0.05-0.9)	0.1 (0.05-0.35)

Markets

- Cattle only
 - To
 - From
- Probability of transmission (PoT)
 - Norm. (mean=0.415, sd=0.06)
- Only until day 21
 - all markets are closed at the day of first detection



Local spread

- Within 3 km
- High risk within 100 meters
 - To create spread between different species on same farm
- 1000 meters 0.012
- 2000 meters 0.004
- 3000 meters 0.001



Surveillance

- Basic surveillance
 - Is the farmers' and vets' daily surveillance of the herd
 - 80% of the swine herds and milking herds
 - 30% of the sheep herds and not-milking herds
- Protection zone (3 km)
 - All herds visited twice!
 - Visited day 5 days (3-7) after creation of the zone
 - Again 21 days later

Surveillance

- Surveillance zone (10 km)
 - All herds visited once
 - Visited day 5 (3-7) days after creation of the zone
- Testing sheep – zones and traced
 - All herds tested 21days after creation of zone
 - 98% chance of detecting disease

Movement restrictions

- Stand still for 3 days
 - All animal movements including animals for slaughter
 - Not persons
- Movements from zones and within zones
 - Animals 0.98
 - Indirect medium 0.7
 - Indirect low 0.3



Tracing

- Animals – (forward)
 - within 0-2 days
 - Prob. forgotten 0.01
 - Depopulated
- Animals – (backwards)
 - within 0-2 days
 - Prob. forgotten 0.01
 - Surveilled
 - 98% chance of being surv.
- Indirect medium
 - within 0-2 days
 - Prob. forgotten 0.5
 - 80% chance of being surv.
- Indirect low
 - within 1-4 days
 - Prob. forgotten 0.5
 - 50% chance of being surv.

Depopulation

- Detected herds (1st priority) - tested
- Traced animal movements (2nd priority)
 - (forwards)
 - Tracing period – 14 days
 - Earlier movements – surveilled – tested



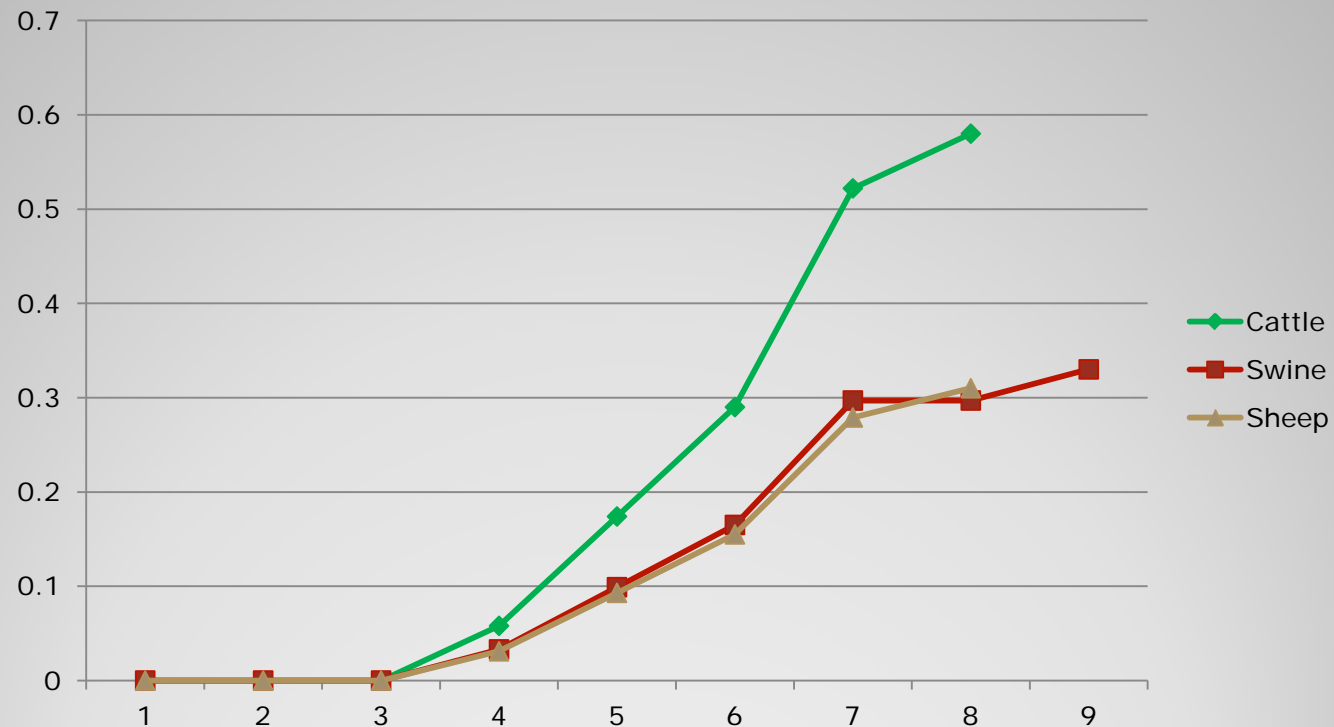
Resources

- Depopulation
 - 2000 ruminants
 - 4800 swine
- Vaccination
 - 50,000 ruminants
 - 60,000 swine

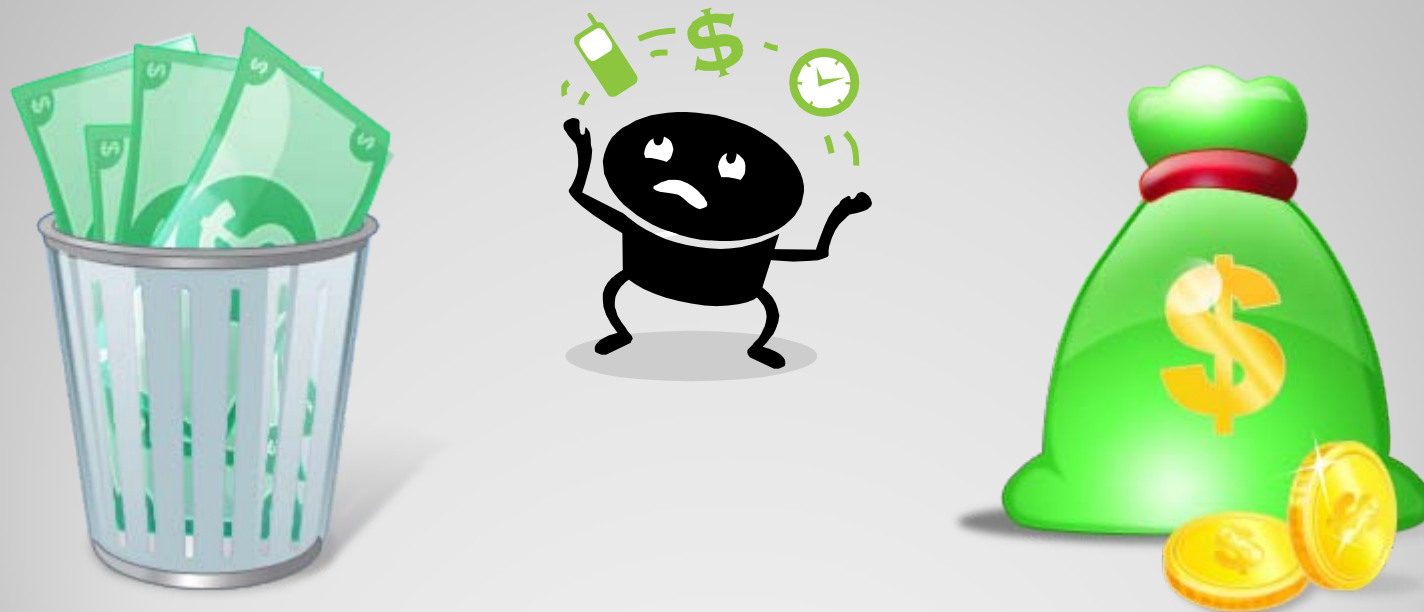


Vaccination

- Vaccine efficacy



Economy



Economy – direct costs



- Surveillance
- Depopulation
- Cleaning & disinfection
- Empty stables
- Compensations
- Welfare slaughter
- National stand still
- Vaccination

Economy – export losses



- EU
- Non-EU
- Live animals
- Animal products



Economy – direct costs



- **Surveillance**

- Visits in surveyed herds
 - Different for different herd category
- Sheep
 - +sampling and serological analyses

Economy – direct costs



- Surveillance
- **Depopulation**
 - Logistics
 - Testing
 - Destruction

Economy – direct costs



- Surveillance
- Depopulation
- **Cleaning+desinfection**
- Empty stables
- Compensations
- Welfare slaughter
- National stand still
- vaccination

Economy – direct costs



- Surveillance
- Depopulation
- Cleaning+desinfection
- **Empty stables**
 - Days within zones after depop
 - VacToKill
 - Days within zones from depop to end of outbreak

Economy – direct costs



- Surveillance
- Depopulation
- Cleaning+desinfection
- Empty stables
- **Compensations**
- Welfare slaughter
- National stand still
- vaccination

Economy – direct costs



- Surveillance
- Depopulation
- Cleaning+desinfection
- Empty stables
- Compensations
- **Welfare slaughter**
 - Only swine herds

Economy – direct costs



- Surveillance
- Depopulation
- Cleaning+desinfection
- Empty stables
- Compensations
- Welfare slaughter
- **National stand still**
 - Pert dist. €5 (4-7) x 10⁶

Economy – direct costs



- Surveillance
- Depopulation
- Cleaning+desinfection
- Empty stables
- Compensations
- Welfare slaughter
- National stand still
- **Vaccination**
 - Vaccine application
 - Testing

Economy - Export losses



- Pigs & pork
 - Live pigs to EU
 - Pig products to EU
 - Pigs and pig products to Non-EU



Economy - Export losses



- Pigs & pork
 - Live pig til EU
 - Pig products to EU
 - Pigs and pig products to Non-EU
 - Assumed sold on EU market with 25% price reduction



Economy - Export losses, swine



Obtain export after EPI	Depop	VacToKill	VacToLive
Non-EU	3 month after last culled herds + 2 (1-3) month	3 month after last culled herds (whether last cull is infected or vaccinated) + 2 (1-3) month	6 month after last culled herds + 2 (1-3) month
EU (affected zones only)	Until lifting of zones		

Economy - Export losses, cattle



Obtain export after EPI	Depop	VacToKill	VacToLive
Fresh milk and Danablu	6 months after last culled herds + 2 (1-3) months		
Other milk prod.	4 months after last culled herds + 2 (1-3) months		